REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1-5, 7 and 16 are currently being amended.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-16 are now pending in this application, with claims 12-15 being directed to a non-elected species.

Applicant acknowledges with appreciation the indication in the Office Action that claims 5-7 contain allowable subject matter and would be allowable if rewritten in independent form. Applicant has rewritten claim 5 accordingly. Claims 6 and 7 depend therefrom. The claim objections to claims 3-5 and 7 have been addressed. The phrase "a preset position" is retained in claims 3-5 since it does not necessarily refer to same preset position as recited in claim 1. The objection to claim 7 has been addressed as suggested by the Examiner.

In the Office Action claims 1 and 16 were rejected under 35 U.S.C. 102(e) as being allegedly anticipated by Yoshikawa et al. (U.S. Patent No. 5,982,402). Claims 2-4 were rejected under 35 U.S.C. 103(a) as being allegedly obvious over Yoshikawa et al. in view of Tanimoto et al. (EP 0 797 343 A2). In view of the amendments to the claims and for at least the reasons set forth herein, these rejections have been overcome.

By way of background, in the present invention as shown in FIG. 4, an optical beam position detector 38 is provided with a sensor pattern SO to detect how an optical beam varies in the sub-scanning direction perpendicular to the main scanning direction. An output of the sensor pattern changes continuously

and in a wide range. The sensor pattern SO serves to accurately sense the relative scan position of the optical beam in a wide range. Based on the output of the sensor pattern SO, a plurality of optical beams scanned across the surface of the photosensitive drum are controlled in such a manner as to pass through the predetermined region.

As shown in FIG. 5, or 7, when an optical beam passes across a trapezoidal sensor SO, the output pulse of the sensor varies continuously in accordance with the scanning position (passage position). The output pulse is supplied to the differential amplifier 60, and an output of this amplifier 60 is supplied to the integrating circuit 42, so as to obtain a level signal corresponding to the passage position of the beam. FIG. 7 shows how the beam passage position and the output of the integrating circuit 42 are related to each other. As can be seen from these figures, the analog level (voltage value) of the output of the beam position detecting means of the present invention varies in accordance with the beam passage position.

In Yoshikawa et al., as shown in FIG. 5, a beam passes through a triangular window 54-1, and the pulse width of a signal output from a beam position detecting means 60-1 varies continuously, depending upon the scan position (passage position) in the window (see FIG. 6). As shown in FIG. 9, the AND circuit 430 of a position shift detecting section 400 obtains the AND between the pulse width and the clock pulse CLK, and clocks, the number of which corresponds to the pulse width, are output. A counter circuit 440 counts the number of clocks, and the count data is supplied to MPU 500 as beam passage position information.

As can be understood from the foregoing discussion, the beam passage position detecting means of Yoshikawa et al. changes the number of clocks in accordance with the beam passage position. Since a beam position is represented based on the number of clocks, quantizing errors are unavoidable. To improve the sensing accuracy (i.e., to reduce the quantizing errors), it is

necessary to increase the clock frequency, and this way for improvement inevitably has a limitation.

In contrast, in the present invention, since the integrator 42 integrates an output of the sensor 60 as shown in FIG. 5, the output signal is an analog level signal and therefore does not cause any quantizing errors. A quantizing error may be produced when the A/D converter unit 43 performs A/D conversion. However, such a quantizing error does not adversely affect the accuracy since the accuracy can be easily enhanced by processing analog signals, such as performing level shifting by use of a D/A converter unit 61 and/or increasing the amplification factor by use of the differential amplifier 60. The claims have been amended to make more clear the differences between the claimed invention and the prior art. Neither Yoshikawa et al. nor Tanimoto et al. disclose, teach or suggest the claimed invention. The rejections under 35 U.S.C. §§ 102 and 103 should be reconsidered and withdrawn.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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